

AUG 31 2006

Serial No. 10/761,832

Docket No. 200309415-1

**REMARKS**

Claims 1-18 and 20-24 are currently pending in the subject application, and are presently under consideration. Claims 1-18 and 20-24 stand rejected. Favorable reconsideration of the application is requested in view of the comments herein.

**I. Rejection of Claims 1, 2, 4, 11, 13, 16 and 21 Under 35 U.S.C. §102(e)**

Claims 1, 2, 4, 11, 13, 16 and 21 stand rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,637,008 to Higuchi, et al. ("Higuchi"). Withdrawal of this rejection is respectfully requested for at least the following reasons.

Claim 1 recites a method for optimizing a circuit design comprising determining real costs for a plurality of first value sets represented as a plurality of real chromosomes, wherein the first values sets comprise a first plurality of circuit configurations associated with the circuit design. Claim 1 also recites determining speculative costs for a plurality of second value sets represented as a plurality of speculative chromosomes, the speculative chromosomes representing value set variations of the first value sets, wherein the second values sets comprise a second plurality of circuit configurations associated with the circuit design. Claim 1 further recites postponing validation of speculative chromosomes by generating subsequent generations of speculative chromosomes and associated speculative costs from parents selected from at least one of the plurality of real chromosomes and the plurality of speculative chromosomes, until a predetermined validation criteria has been satisfied.

Higuchi does not anticipate claim 1. Higuchi does not disclose determining speculative costs for a plurality of second value sets represented as a plurality of speculative chromosomes, the speculative chromosomes representing value set variations of the first value sets, wherein the second value sets comprise a second plurality of circuit configurations associated with a circuit design, as recited in claim 1. In the rejection of claim 1, the Examiner contends that the "real cost" recited in claim 1 corresponds to the "timing" disclosed in Higuchi (See Office Action, Page 3). Assuming *arguendo* that timing as disclosed in Higuchi is similar to the real cost recited in claim 1, the Examiner has still not identified any structure or process disclosed in

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Higuchi that corresponds to the "speculative costs" recited in claim 1. In Higuchi, FIG. 7 illustrates a flowchart showing a procedure of an electronic circuit adjusting method (See Higuchi, Col. 6, Lines 1-3). Higuchi discloses that at step S3 of FIG. 7, analyzer 9 analyzes a filtering process output of a filter circuit 1F and sends the analysis result to a setting circuit 8 (See Higuchi, Col. 10, Lines 48-51). Claim 1 recites determining two different kinds of costs, namely, real costs and speculative costs. Speculative costs are an approximate cost for a given value set represented as a speculative chromosome (See Spec., Page 4, Lines 20-21). Higuchi does not disclose that analyzer 9 produces speculative costs. Additionally, Higuchi does not disclose determining two different kinds of costs. Instead, Higuchi discloses that the same analyzer 9 is used to analyze all filtering process outputs (See Higuchi, FIG. 7).

Moreover, since Higuchi does not disclose speculative costs, Higuchi cannot disclose postponing validation of speculative chromosomes by generating subsequent generations of speculative chromosomes and associated speculative costs from parents selected from at least one of a plurality of real chromosomes and the plurality of speculative chromosomes until a predetermined validation criteria has been satisfied, as recited in claim 1. Therefore, Higuchi does not disclose each and every element of claim 1. Accordingly, Higuchi does not anticipate claim 1, and claim 1 should be patentable over the cited art.

Claims 2 and 4 depend from claim 1 and are not anticipated for at least the same reasons as claim 1, and for the specific elements recited therein. Accordingly, claims 2 and 4 should be patentable over the cited art.

Additionally, claim 2 further illustrates the differences between real costs and speculative costs. Claim 2 recites determining real costs for at least one speculative chromosomes of a plurality of chromosomes when a predetermined validation criteria has been satisfied, wherein the real costs are determined by a circuit analysis tool and a power/timing estimator. Since claim 2 depends from claim 1, claim 2 recites real costs and speculative costs are determined for at least one speculative chromosome. Higuchi does not disclose calculating different costs (real and speculative) for at least one speculative chromosome. Instead, Higuchi discloses only that

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the same analyzer (analyzer 9) is used to analyze filtering process outputs. Accordingly, Higuchi does not disclose each and every element of claim 2.

Additionally, regarding claim 4, Higuchi does not disclose determining speculative costs comprising executing an incremental cost function on a plurality of speculative chromosomes, the incremental cost function determines a speculative cost by approximating a cost effect of an incremental change in a value set of a speculative chromosome relative to a parent chromosome and a cost associated with the parent chromosome, as recited in claim 4. In rejecting claim 4, the Examiner contends that "cost effect" as recited in claim 4 is equivalent to "optimize" as disclosed in Higuchi (See Office Action, Page 4 citing Col. 31, Lines 22-32 of Higuchi). Applicant's representative respectfully disagrees. The cited section of Higuchi does not mention optimizing. Additionally, assuming *arguendo* that cost effect and optimize are similar, Higuchi does not disclose approximating a cost effect, as recited in claim 4. Accordingly, Higuchi does not disclose each and every element of claim 4.

Regarding claim 11, Higuchi does not disclose executing an incremental cost function on a plurality of speculative chromosomes to generate a plurality of speculative costs for each of a plurality of speculative chromosomes, the incremental cost function determines a speculative cost by approximating a cost effect of an incremental change in a value set of a speculative chromosome relative to a parent chromosome and a cost associated with the parent chromosome, as recited in claim 11. For the reasons stated above with respect to claim 4, Higuchi does not disclose approximating a cost effect, as recited in claim 11. Therefore, Higuchi does not disclose executing an incremental cost function, as recited in claim 11. Additionally, since Higuchi does not disclose executing an incremental cost function, as recited in claim 11, Higuchi also does not disclose repeating execution of a genetic algorithm to produce subsequent generations of speculative chromosomes and repeating execution of an incremental cost function of subsequent generations to provide speculative costs for the subsequent generations of speculative chromosomes, until a predetermined validation criteria has been satisfied, as recited in claim 11. Therefore, Higuchi does not disclose each and every element of claim 11. Accordingly, Higuchi does not anticipate claim 11, and claim 11 should be patentable over the cited art.

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Claim 13 depends from claim 11 and is not anticipated for at least the same reasons as claim 11 and for the specific elements recited therein. Additionally, Higuchi does not disclose validating at least one speculative chromosome of a plurality of speculative chromosomes when a predetermined validation criteria has been satisfied, the validating at least one speculative chromosome comprising executing a real cost function on the at least one speculative chromosome to generate a real cost associated with the at least one speculative chromosome, as recited in claim 13. In rejecting claim 13, the Examiner contends that validating, as recited in claim 13 is equivalent to the judgment step S23 disclosed in Column 15, Lines 24-33 of Higuchi. Applicant's representative respectfully disagrees. The cited section of Higuchi discloses that when a filter circuit main part 3F has satisfied designated specifications from judgment step 23, the adjustment process is ended (See Higuchi, Col. 15, Lines 24-26). However, since claim 13 depends from claim 11, in claim 13, an incremental cost function and a real cost function are executed on at least one speculative chromosome. Higuchi does not disclose executing both, an incremental cost function and a real cost function on at least one speculative chromosome. Instead, as stated above with respect to claim 2, Higuchi discloses only that analyzer 9 is used to analyze all filtering process outputs. Accordingly, Higuchi does not disclose each and every element of claim 13.

Regarding claim 16, Higuchi does not disclose an incremental cost function that generates a plurality of speculative costs corresponding to a plurality of value set variations of at least one of a plurality of real chromosomes, the plurality of value set variations represented as a plurality of speculative chromosomes, the incremental cost function determines a speculative cost by approximating a cost effect of an incremental change in a value set of a speculative chromosome relative to a parent chromosome and a cost associated with the parent chromosome, as recited in claim 16. For the reasons stated above with respect to claim 11, Higuchi does not disclose approximating a cost effect, as recited in claim 16. Therefore, Higuchi does not disclose an incremental cost function, as recited in claim 16.

Moreover, Higuchi does not disclose a validator that initiates a validation on at least one speculative chromosome upon satisfaction of a predetermined validation criteria, a validation

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comprising executing a real cost function on at least one speculative chromosome to generate a real cost associated with at least one speculative chromosome, as recited in claim 16. In claim 16, both the incremental cost function and the real cost function are executed on at least one speculative chromosome. Higuchi does not disclose executing two different cost functions on a filtering process output as implied by the Examiner. Accordingly, Higuchi does not disclose each and every element of claim 16. Therefore, Higuchi does not anticipate claim 16, and claim 16 should be patentable over the cited art.

Regarding claim 21, Higuchi does not disclose means for determining a speculative cost for a respective chromosome based on a cost of at least one parent chromosome and a cost effect based on a difference in value sets of the at least one parent chromosome and a cost effect based on a difference in value sets of at least one parent chromosome and a respective speculative chromosome, as recited in claim 21. Claim 21 recites determining two different costs, namely real costs and speculative costs. As stated above with respect to claims 1, 11 and 16, Higuchi does not disclose determining two different costs. Therefore, Higuchi does not disclose the means for determining a speculative cost, as recited in claim 21. Accordingly, Higuchi does not disclose each and every element of claim 21, and claim 21 should be patentable over the cited art.

For the reasons described above, claims 1, 2, 4, 11, 13, 16 and 21 should be patentable over the cited art. Accordingly, withdrawal of this rejection is respectfully requested.

## II. Rejection of Claims 3, 6, 7, 9, 10, 15, 20 and 23 Under 35 U.S.C. §103(a)

Claims 3, 6, 7, 9, 10, 15, 20 and 23 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Higuchi in view of *Problem Solving with C++*, by Savitch ("Savitch"). Withdrawal of this rejection is respectfully requested for at least the following reasons.

The addition of Savitch does not make up for the aforementioned deficiencies of Higuchi with respect to claims 1, 11, 16 and 21, as stated above. Claims 3, 6, 7, 9 and 10 depend from claim 1, while claim 15 depends from claim 11, claim 20 depends from claim 16 and claim 23

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depends from claim 21. Accordingly, claims 3, 6, 7, 9, 10, 15, 20 and 23 are not obvious over Higuchi in view of Savitch.

Savitch discloses basic C++ operators, including the '>' operator (the greater than operator). The Examiner states that it would be obvious to combine the C++ Boolean expressions taught in Savitch to the teachings of Higuchi to make obvious each of the applicant's specific claims to the predetermined validation criteria. Applicant's representative respectfully disagrees with the Examiner's blanket rejection of each the applicant's specific claims to the predetermined validation criteria.

The Examiner has not stated any motivation or suggestion or manner of modifying the Boolean expressions taught by Savitch to provide the elements of the specific claims to the predetermined validation criteria recited in claims 3, 6, 7, 9, 10, 15, 20 and 23. The fact that a prior art reference could be modified so as to produce the claimed device is not a basis for obviousness unless the prior art suggested the desirability of such a modification. *In re Gordon*, 733 F.2d 900, 901, 221 U.S.P.Q. 1125. It is respectfully submitted that the Examiner has not set forth any reason as to why it would be desirable to implement the particular predetermined validation criteria recited in claims 3, 6, 7, 9, 10, 15, 20 and 23. Additionally, as stated above, the Federal Circuit has held that in order to render a claimed apparatus or method obvious, the prior art must enable one skilled in the art to make and use the apparatus or method. *Beckman Instruments, Inc. v LKB Produkter AB*, 892 F.2d 1547, 1551, 13 U.S.P.Q.2d, 1301. It is respectfully submitted the combination of Higuchi would not enable one skilled in the art to make the claimed invention of claims 3, 6, 7, 9, 10, 15, 20 and 23, since none of the cited art discloses anything that could be construed as the predetermined validation criteria recited in claims 3, 6, 7, 9, 10, 20 and 23. Thus, Higuchi taken in view of Savitch does not make claim 3, 6, 7, 9, 10, 20 and 23 obvious.

Specifically, Savitch does not teach or suggest assigning a speculation count to each generation of speculative chromosomes, a predetermined validation criteria being a specific speculation count, as recited in claim 3. Thus, Higuchi taken in view of Savitch does not teach or suggest each and every element of claim 3.

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Moreover, claims 6-7 depend from claim 5. In the rejection claims 6-7, the Examiner does not contend that either Higuchi or Savitch teaches or suggests the elements recited in claim 5, from which claims 6-7 depend. Accordingly, Applicant's representative respectfully submits that the rejection of claims 6-7 is improper.

Savitch does not teach or suggest that predetermined validation criteria comprises a speculative cost difference between a generation of speculative chromosomes and a plurality of real chromosomes, as recited in claim 6. Thus, Higuchi taken in view of Savitch does not teach or suggest each and every element of claim 6.

Savitch does not teach or suggest that predetermined validation criteria comprises a cost difference between a generation of speculative chromosomes and a plurality of real chromosomes exceeding a predetermined cost change limit, as recited in claim 7. Thus, Higuchi taken in view of Savitch does not teach or suggest each and every element of claim 7.

Savitch does not teach or suggest a predetermined validation criteria comprises speculation errors associated with each generation of speculation exceeding a predetermined limit, as recited in claim 9. Thus, Higuchi taken in view of Savitch does not teach or suggest each and every element of claim 9.

Savitch does not teach or suggest a predetermined criteria comprises exceeding an execution time limit for generating subsequent generations of speculative chromosomes and generating speculative costs associated with the subsequent generation, as recited in claim 10. Thus, Higuchi taken in view of Savitch does not teach or suggest each and every element of claim 10.

Savitch does not teach or suggest that validation criteria is based on satisfying at least one of a speculative chromosome generation count exceeding a predetermined cost change limit between speculative generations and exceeding a predetermined cost change limit between a plurality of real chromosomes and a speculative generation, as recited in claim 15. Thus, Higuchi taken in view of Savitch does not teach or suggest each and every element of claim 15.

Savitch does not teach or suggest that validation criteria is based on at least one of satisfying a speculative chromosome generation count exceeding a predetermined cost change

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limit between speculative generations and exceeding a predetermined cost change limit between the plurality of real chromosomes and a speculative generation, as recited in claim 20. Thus, Higuchi taken in view of Savitch does not teach or suggest each and every element of claim 20.

Savitch does not teach or suggest that validation criteria is based on at least one of satisfying a speculative chromosome generation count exceeding a predetermined cost change limit between speculative generations and exceeding a predetermined cost change limit between the plurality of real chromosomes and a speculative generation, as recited in claim 23. Thus, Higuchi taken in view of Savitch does not teach or suggest each and every element of claim 23.

For the reasons described above, claims 3, 6, 7, 9, 10, 15, 20 and 23 should be patentable over the cited art. Accordingly, withdrawal of this rejection is respectfully requested.

### **III. Rejection of Claims 5, 12, 14, 17, 18, 22 and 24 Under 35 U.S.C. §103(a)**

Claims 5, 12, 14, 17, 18, 22 and 24 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Higuchi in view of U.S. Patent No. 6,181,945 to Lee ("Lee"). Withdrawal of this rejection is respectfully requested for at least the following reasons.

The addition of Lee does not make up for the aforementioned deficiencies of Higuchi with respect to claims 1, 11, 16 and 21, as stated above. Claim 5 depends from claim 1, while claims 12 and 14 depend from claim 11, claims 17 and 18 depend from claim 16 and claims 22 and 24 depend from claim 21. Accordingly, claims 5, 12, 14, 17, 18, 22 and 24 are not obvious over Higuchi in view of Lee.

Additionally, claim 5 recites assigning a real cost to a plurality of real chromosomes based on a minimum cost real chromosome in a plurality of real chromosomes and assigning a speculation cost to each generation of speculative chromosomes based on a minimum cost speculative chromosome in a respective generation. In the rejection of claim 5, the Examiner contends that Column 10, Line 62 through Column 11, Line 50 of Lee discloses the elements recited in claim 5. Applicant's representative respectfully disagrees. The cited section of Lee discloses determining a paging cost of each zone paging plan (See Lee, Col. 11, Lines 19-20). The cited section of Lee also discloses replacing two highest paging cost plans by two children



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paging plans (See Lee, Col. 11, Lines 35-36). In claim 5, real costs are assigned to a plurality of real chromosomes and a speculative cost is assigned to each generation of speculative chromosomes. Lee is silent on assigning any plurality of paging plans a cost other than the calculated paging cost for each plan. In fact, in response to Applicant's representative's previous arguments regarding claim 5, the Examiner admits that the cost of the children and the cost of the parents disclosed in Lee are the same definition of cost (See Office Action, Page 31). Thus, Higuchi taken in view of Lee, does not teach or suggest each and every element of claim 5.

Furthermore, claim 12 recites generating an incremental cost function based on at least one real chromosome and associated real cost. Claim 12 further illustrates the difference between the real cost function recited in claim 11, from which claim 12 depends, and the incremental cost function recited in claim 12. As stated above, none of the cited art teaches or suggests two different cost functions. In response to Applicant's representative's previous arguments regarding claim 12, the Examiner asserts that in Lee, the cost function of a child is one function and the cost of a parent is a second function (See Office Action, Page 33). Applicant's representative respectfully disagrees with this interpretation of Lee. Nothing in Lee discloses that the parents and the children costs are calculated with different cost functions. Accordingly, Higuchi taken in view of Lee does not teach or suggest each and every element of claim 12.

Further still, claim 24 further recites validation of a plurality of speculative chromosomes comprising executing means for determining a real cost on at least one speculative chromosome. Since claim 24 depends from claim 21, the real cost and the speculative cost is determined for at least one speculative chromosome. Lee does not teach or suggest determining two different costs for at least one speculative chromosome, as recited in claim 24. As discussed above, Lee does not disclose two different cost functions. Thus, Higuchi taken in view of Lee does not teach or suggest each and every element of claim 24.

For the reasons described above, claims 5, 12, 14, 17, 18, 22 and 24 should be patentable over the cited art. Accordingly, withdrawal of this rejection is respectfully requested.

**Serial No. 10/761,832****Docket No. 200309415-1****IV. Rejection of Claim 8 Under 35 U.S.C. §103(a)**

Claim 8 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Higuchi in view of U.S. Publication No. 2004/0001021 to Choo ("Choo"). Withdrawal of this rejection is respectfully requested for at least the following reasons.

Choo does not makeup for the aforementioned deficiencies of Higuchi with respect to claim 1, from which claim 8 depends. Additionally, Higuchi taken in view of Choo, does not teach or suggest that predetermined validation criteria comprises speculative costs converging for subsequent generations of speculative chromosomes, as recited in claim 8. The Examiner contends that paragraph [0063] of Choo discloses the elements recited in claim 8. Applicant's representative respectfully disagrees. The cited section Choo discloses that evaluating a cost function (step 104 of FIG. 1 of Choo) may include a convergence check (See Choo, Para. [0063]). However, similarly to Lee and Higuchi, Choo discloses only one cost function. In contrast, in claim 8, the validation criteria comprises speculative costs converging as opposed to real costs converging. Nothing in Choo teaches or suggests that the cost function disclosed could calculate speculative costs.

Moreover, in response to Applicant's representative's previous arguments regarding claim 8, the Examiner asserts that since speculation is a precursor of real and visa versa, there is no difference (See Office Action, Page 43). Applicant's representative respectfully disagrees. As stated above with respect to claim 1, speculative costs are an approximation of real costs. Clearly, there is a difference between approximate and real costs. Accordingly, Choo does not teach or suggest that validation criteria comprises speculative costs converging for subsequent generations of speculative chromosomes, as recited in claim 8. Thus, Higuchi taken in view of Choo does not teach or suggest each and every element of claim 8. Therefore, Higuchi taken in view of Choo does not make claim 8 obvious.

For the reasons described above, claim 8 should be patentable over the cited art. Accordingly, withdrawal of this rejection is respectfully requested.

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**CONCLUSION**

In view of the foregoing remarks, Applicant's representative respectfully submits that the present application is in condition for allowance. Applicant's representative respectfully requests reconsideration of this application and that the application be passed to issue.

Should the Examiner have any questions concerning this paper, the Examiner is invited and encouraged to contact Applicant's undersigned attorney at (216) 621-2234, Ext. 104.

No additional fees should be due for this response. In the event any fees are due in connection with the filing of this document, the Commissioner is authorized to charge those fees to Deposit Account No. 08-2025.

Respectfully submitted,

By:   
Christopher P. Harris  
Registration No. 43,660  
Attorney for Applicant(s)

**CUSTOMER NO.: 022879**

Hewlett-Packard Company  
Legal Department MS 79  
3404 E. Harmony Road  
Ft. Collins, CO 80528

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